THE HYDROID ZOOPHYTES COLLECTED BY DR WILLEY IN THE SOUTHERN SEAS.

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With Plate XLIV.

THE Hydroids in this collection, though many of them are broken from their colonies in a tantalizing way, were evidently so full of life when gathered, and are so beautifully preserved, that to the smallest details they have been interesting to examine. Of two or three species, as I have noted under the descriptions of them, there are considerable quantities; of others, few, but complete, colonies; and of several too little to allow me to do more than identify the genus to which they belong. Of these last there is a *Cryptolaria*, probably *C. pulchella* Allman, a *Eudendrium*, a *Lafoea*, two *Thuiarians*, an *Ophiodes*, and a *Sertularella*, probably *S. angulosa.*

I am much indebted to Dr Willey for trusting me with his specimens, and I should like to offer my very best thanks to Professor Herdman, D.Sc., F.R.S., for his very great help with advice and with books.

FAMILY. ATRACTYLIDÆ, Hincks.

GENUS. *Hydranthea,* Hincks.

Hydranthea australis, n. sp.

There are several little colonies of this species creeping over other zoophytes. The stem is very short, enclosed at the base in little cup-like extensions of the polypary, as in *Hydranthea margarica,* Hincks[1], which also has numerous tentacles in a single verticil and large gonophores like this species. The tubercles of thread cells at the base of the tentacles, and the four branched vessels in the gonophore, characteristics of *Hydranthea,* are not visible in these specimens, but the whole appearance points to the species being of this genus and closely related to *H. margarica.*

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[1] *British Hydroid Zoophytes,* 1868, p. 100.

The position of the gonophore, rising from the side of the cup of the hydrotheca, instead of from the stolon and within a cup of its own, is the only marked difference which makes it necessary to separate the species.

LOCALITY. Blanche Bay, New Britain; growing among other zoophytes attached to ropes and fish-baskets down to 40 fathoms.

GENUS. *Bougainvillia,* Lesson.

Bougainvillia muscus Allman, Pl. XLIV. Figs. 2, 2*a*, 2*b*.

There are colonies of this *Bougainvillia* covering the cast spines of a *Cidaris.* They are taller than the description of *B. muscus,* as described by Hincks[1], corresponding thus more with his form intermediate between that species and *B. ramosa,* but they have not the compound stem of this form though they have the sanded polypary.

These colonies have gonophores (Fig. 2*b*) borne on the stem, some way below the polypites, two or three together on a branched offshoot.

From a separate collection taken from ropes and fish-baskets and floats there are also some colonies which are shorter and have curious tendrils, some simple, some branched (Fig. 2*a*), and of varying lengths, attached to the stems below the polypites.

The characters in both these sets of specimens do not seem sufficiently marked to justify the formation of a species apart from *Bougainvillia muscus* Allman.

LOCALITY. Blanche Bay, New Britain.

FAMILY. TUBULARIIDÆ, Hincks.

GENUS. *Ectopleura,* L. Agassiz.

Ectopleura pacifica, n. sp., Pl. XLIV. Figs. 1, 1*a*.

Of this fine species there are a profusion of colonies, detached from floats, fish-baskets, &c. The stems are simple, unringed, diminishing in width towards the base and about 2 cm. high, rising from a creeping stolon which connects the colony. There are some processes given off from the stem near the base in many of the specimens which probably help to attach the colonies to the objects they grow upon. The polypite is abruptly marked off from the supporting stalk. The tentacles are disposed in two verticils of from 18—20 each. The distal tentacles appear to be not wholly filiform (see Fig. 1), but this may be the effect of contraction of the preserved specimen.

The gonophores are borne in clusters of from seven to nine on branched peduncles which spring from the body of the polypite, between the two sets of tentacles. The most highly developed among them have two long tentacles (Fig. 1*a*), and there are indications of what may be the eight longitudinal ribs formed of the linear series of thread cells found in the genus *Ectopleura.* The above species is quite distinct from the only other Ectopleura, *E. dumortierii,* Van Beneden.

LOCALITY. Blanche Bay, New Britain.

[1] *British Hydroid Zoophytes*, 1868, p. 111.

FAMILY. CAMPANULARIIDAE, Hincks.

GENUS. *Obelia*, Peron et Lesueur.

Obelia linearis, n. sp., Pl. XLIV. Fig. 6.

There are only two little rooted specimens of this species, 7 mm. in height. The stem is simple, horn-coloured below, transparent above, and is branched (see Fig. 6).

The hydrothecae are deep, their margins have about twelve blunted teeth around them. There are usually longitudinal lines to be seen on the hydrothecae, the result probably of the collapsing of their delicate sides.

The gonothecae are borne in the axils of the peduncles, they are elongate oval. smooth, and with a prominent rim to the orifice.

The gonozooids seen within the gonothecae show signs of tentacles in those that are uppermost in the gonothecae.

LOCALITY. Blanche Bay, New Britain.

Obelia delicatula, n. sp., Pl. XLIV. Fig. 7.

This is a smaller, more delicate form than the last, and unbranched, but the hydrothecae and gonothecae are much the same in their characters.

The stem reaches 4 mm. in height, borne on a creeping stolon, which carries the gonothecae also.

The stems are ringed at their bases, and here and there above, and are also several times ringed under the hydrothecae (Fig. 7). The whole colony has much the appearance of *Campanularia phycocyathus*, Allman[1], but the zooids in the gonothecae show the budding tentacles of the free swimming medusoid, showing that it does not belong to that genus.

LOCALITY. Blanche Bay, New Britain, 40 fathoms.

Obelia serrulata, Bale (sp.), Pl. XLIV. Fig. 5.

The largest piece among the fragments collected of this species is a little over 1 cm. in height. It is branched and has a strong compound stem formed by the downward growth of stolons from the peduncles of the hydrothecae.

The hydrothecae are very broad above, tapering downwards towards the base. The floor is raised above the base so as to leave a large cavity beneath it, and this character, together with that of the marginal teeth, agrees with Mr Bales'[2] description of *Campanularia? serrulata*, Bale, found at Port Jackson. His specimens were delicate, and there being no gonothecae present makes it appear likely that they were immature.

The gonotheca of the present species is oval, truncated above, and borne on the stem, and contains zooids with budding tentacles (Fig. 5).

LOCALITY. Blanche Bay, New Britain: from ropes and fish-baskets in 40 fathoms.

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[1] *Voyage of H.M.S. Challenger, Report on the Hydroida*, Pt II.

[2] *Proc. Linn. Soc. New South Wales*, Vol. III. 1888, p. 757.

GENUS. *Campanularia*, Lamouroux (in part).

Campanularia brevithecata, n. sp., Pl. XLIV. Fig. 8, 8 *a*, 8 *b*.

This form has a simple, unbranched stem, a little more than 1 cm. in length, very slender, with several rings at the base (Fig. 8 *a*) and one or two at intervals up the stem, while directly below the hydrotheca there is one spherical ring as in *Campanularia volubilis*, Linnaeus.

The hydrotheca is extremely short, so as only to cover about one-third of the polypite when it is extended, and has an even rim (Fig. 8).

The polypite has about twenty tentacles, and a remarkably large trumpet-shaped proboscis, suggestive of a *Eudendrium* from which the species is widely separated by its other characters.

The gonothecae (Fig. 8 *b*) present rise from the stolon on short pedicels, and have the appearance of those of *Campanularia caliculata*, Hincks, as figured by Hincks[1], and contain one or two large sporosacs with four gastro-vascular canals to each.

C. caliculata Hincks, as figured by Mr Bale[2], has much the appearance of my specimen, but without the polypite the proportional sizes of polypite and calycle are not obvious. In some of Mr Bale's specimens from Port Jackson the calycles have not the thickened wall usual in *C. caliculata*, which would bring it nearer to our form, but there are still sufficient grounds for considering this a new species on account of the smallness of the theca and the largeness of the polypite proboscis.

LOCALITY. Blanche Bay, New Britain, one colony covering the body of a *Lepas*, others detached from ropes and fish-baskets.

GENUS. *Gonothyraea*, Allman.

Gonothyraea longicyatha, n. sp., Pl. XLIV. Fig. 4, 4 *a*.

There are a large number of complete colonies of this strikingly pretty form. Their height is about 3 cm., they are much branched, the main stem is deep brown in colour, and offshoots from the bases of the pedicels of the hydrotheca, growing downwards, form a strong componnd stem (Fig. 4 *a*), as described by Dr Hartlaub[3] for *Obelaria gelatinosa*, and by Mr Bale[4] for *Obelia ? spinulosa*.

The hydrothecae are remarkably long and narrow, and the castellations on their rims so deeply grooved as to make sharp, needle-like points of their edges (see Fig. 4).

The gonothecae are very numerous, borne on short ringed pedicels in the axils of the branches. They are oval and truncated at the top. In nearly all cases they are flattened laterally, which makes the top fall in, forming a groove, but this is probably a result of the preservation of a delicate form.

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[1] *British Hydroid Zoophytes*, 1868, Pl. 31, Fig. 2 *d*.

[2] *Proc. Linn. Soc. New South Wales*, Vol. III. 1888, p. 755.

[3] *Meeresfauna von Helgoland* 1897, *Zweiter Bericht, Kiel.*

[4] *Proc. Linn. Soc. New South Wales*, Vol. III. p. 756.

I have only seen one external capsule, and that is not perfect, but unfolding tentacles can be seen on the uppermost sporosac in several of the gonothecae.

This description agrees with that of *Gonothyraea hyalina*, Hincks[1], to some extent, but here there is the fascicled stem, and the hydrothecae, as well as the points on their turrets, are more drawn out, while their total size is less. If what appears to be an external capsule is in reality an escaping medusiform zooid, the species may be an *Obelia*.

Obelia longicyatha, Allman[2], is like the present species in the shape of the hydrothecae, but not in that of the teeth on their margins. *Campanularia ? spinulosa*, Bale[3], agrees in the shape of the hydrotheca and its teeth and in the polysiphonic stem, and as gonothecae have not been found for this form it is possibly this species. From the description by Mr Clarke of *Obelia bidentata*[4] it is evidently a much larger species than this.

LOCALITY. Blanche Bay, New Britain: from floats and ropes attached to fish-baskets, some from a depth of 50 fathoms.

FAMILY. SERTULARIIDAE, Hincks.

GENUS. *Sertularia*, Linné (in part).

Sertularia pusilla, n. sp.

This is a minute species, only 3 mm. in height, and looking in all ways only half the size of the *Pasythea quadridentata*, Ellis and Sol., amongst which it is growing.

The opposite hydrothecae join each other in front and are separated behind. They are very long and slender, and delicate looking, as are the internodes which bear these one pair on each. The polypites show almost black through the transparent polypary.

LOCALITY. Lifu, Loyalty Islands.

Sertularia littoralis, n. sp.

There are several specimens of a little *Sertularia* of a bright brown colour, looking like *S. pumila*, Linnaeus. They are smaller than that form, however, being only 7 mm. in height, and with the branches in the one specimen that has any, alternate instead of opposite. These are placed on the internodes, below the hydrothecae of three successive internodes, beginning on the third from the base. The hydrothecae are opposite in all cases, and there are none in the axils of the branches. They are in contact with each other in front, separated behind, and have a horizontal fold crossing the cell as in *S. loculosa*, Busk.

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[1] *British Hydroid Zoophytes*, 1868, p. 184.

[2] "Report on the hydroida collected during the exploration of the Gulf Stream," by L. F. de Pourtalès. *Memoirs Museum of Comparative Zoology, Harvard University*, Vol. v. (1877), p. 10.

[3] *Proc. Linn. Soc. New South Wales*, Vol. III. 1888, p. 756.

[4] "Description of new and rare Hydroids from the New England coast." *Transactions of the Connecticut Academy of Arts and Sciences*, Vol. III. Pt. 1.

There are no gonothecae.

LOCALITY. Lifu, Loyalty Islands; littoral.

GENUS. *Pasythea*, Lamouroux.

Pasythea quadridentata, Ellis and Solander. Nat. Hist. of Zoophytes, London, 1786. There are a few fragments of this species.

LOCALITY. Lifu, Loyalty Islands.

FAMILY. PLUMULARIIDAE, Hincks.

GENUS. *Aglaophenia*, Lamouroux (in part).

Aglaophenia bellis, n. sp.

This species has almost the exact appearance of Professor Allman's[1] figure of *Aglaophenia Macgillivrayi*, Busk (sp.), and most of its details correspond with his description of them, but there are a few marked differences which I think make a separation necessary.

There is the fascicled stem with opposite pinnae as in *A. Macgillivrayi*, giving off secondary alternate pinnae which carry the hydrothecae, and there are branches taking the places of pinnae at irregular intervals and resembling the stem in structure. It is remarkable in this species the thickness of even the pinnae, the hydrothecae bearing pinnae, forming merely a feathered line up the middle of a thick "woody" stem, which is spotted by the lateral communications between its tubes spoken of by Professor Allman[2] as a characteristic of this group.

The hydrothecae have the same intrathecal ridge as in *A. Macgillivrayi*, the mesial sarcothecae are adnate for their whole length, the same height as the hydrothecae, bithalamic and canaliculate, and the lateral sarcothecae correspond, but I cannot see the intracauline ridges, and the margins of the hydrothecae have a little projecting point on either side.

The corbula is closed, with about eight series of costae, but there is no spur-like sarcotheca at the base, nor cup at the summit of each costa which give so striking an appearance to Professor Allman's figure of the corbula in *A. Macgillivrayi*.

Viewed from the front my corbulae show that the ribs are disjointed in the middle, the two halves rise from different points at their bases and do not therefore meet above. This form would agree with Professor Allman's[3] idea that these corbulae are formed of the mesial sarcothecae of a hydrocladium or ultimate pinna, which, deprived of their hydrothecae and lateral sarcothecae, are thrown off to left and right alternately up the pinna, giving off secondary sarcothecae which continue the ribs upwards. The position of the corbula taking the place of a hydrotheca bearing pinna and the number of the costae corresponding with the number of hydrothecae on these pinnae, allowing for the one complete hydrotheca which is always present below the corbula in these specimens, makes it seem natural that the corbulae are formed thus.

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[1] *Voyage of the 'Rattlesnake,'* Vol. I. 1852, p. 400.

[2] *Voyage of H.M.S. Challenger*, Pt I, 1883, p. 5.

[3] *Ibid.*, Pt. I. p. 11.

There are only a few species known of *Aglaophenia* which have the doubly pinnate ramification and the bithalamic form of mesial sarcotheca, and *A. Macgillivrayi* is the only representative in Australian seas.

LOCALITY. Engineer group, British New Guinea.

GENUS. *Plumularia*, Lamarck (in part).

Plumularia compacta, n. sp., Pl. XLIV. Fig. 3.

A good large quantity of this species was found. The colonies resemble the description by Mr Bale[1] of a small variety of *Plumularia setaceoides*, Bale[2]. They are pale horn colour, unbranched, 1·5 cm. in height. The pinnae are alternate and bear four hydrothecae at most, which have even rims and a mesial and two lateral sarcothecae, while there is also a sarcotheca on an internode between every two hydrotheca-bearing internodes and one on the lower part of each stem internode.

The gonothecae grow near the bases of the stems, below the pinna-bearing internodes. They differ from those of *P. setaceoides*, which are obliquely truncated a little above the broadest part, in tapering upwards from the broadest part about as much as they taper downwards below it and in terminating with a neat rim. These gonothecae show clearly that this is not Mr Bale's *P. setaceoides*: it may be what he described as a smaller variety, in which he found no gonothecae, but in that case it must become the independent species—which I have described above as *P. compacta*.

LOCALITY. New Caledonia.

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[1] *Catalogue of the Australian Hydroids*, 1884.

[2] *Journ. Mic. Soc. Vict.*, II. (fig.).

EXPLANATION OF PLATE XLIV.

Fig. 1. *Ectopleura pacifica*, n. sp.
,, 1 *a*. The gonophores.

Fig. 2. *Bougainvillia muscus*, Allman.
,, 2 *a*. Tendrils.
,, 2 *b*. Gonophore.

Fig. 3. *Plumularia compacta*, n. sp.

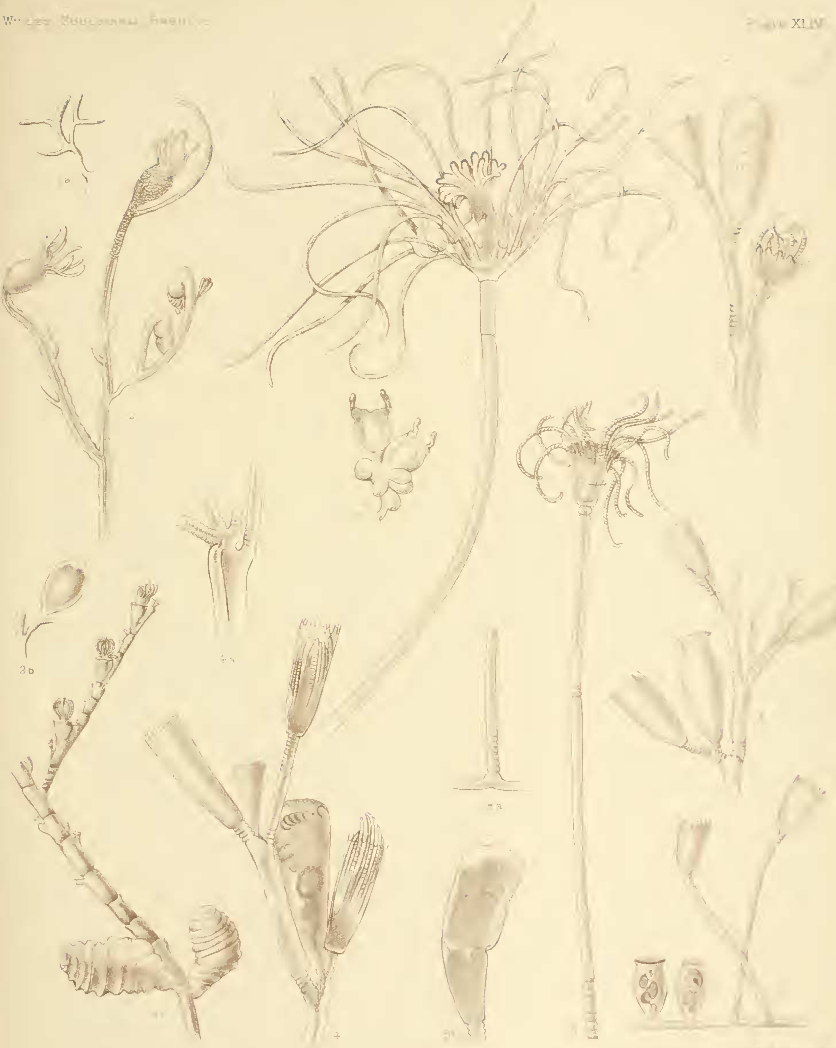
Fig. 4. *Gonothyraea longicyatha*, n. sp.
,, 4 *a*. The stem showing the downward growth of the stolon.

Fig. 5. *Obelia serrulata*, Bale (sp.)

Fig. 6. ,, *linearis*, n. sp.

Fig. 7. ,, *delicatula*, n. sp.

Fig. 8. *Campanularia brevithecata*, n. sp.
,, 8 *a*. Base of the stem.
,, 8 *b*. The gonotheca.



THORNELY HYDROIDS